

New geological, structural and volcanological data of the Los Humeros Volcanic Complex: implications for reconstruction of the 3D model volcanic structure and geothermal exploration



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State-of-art

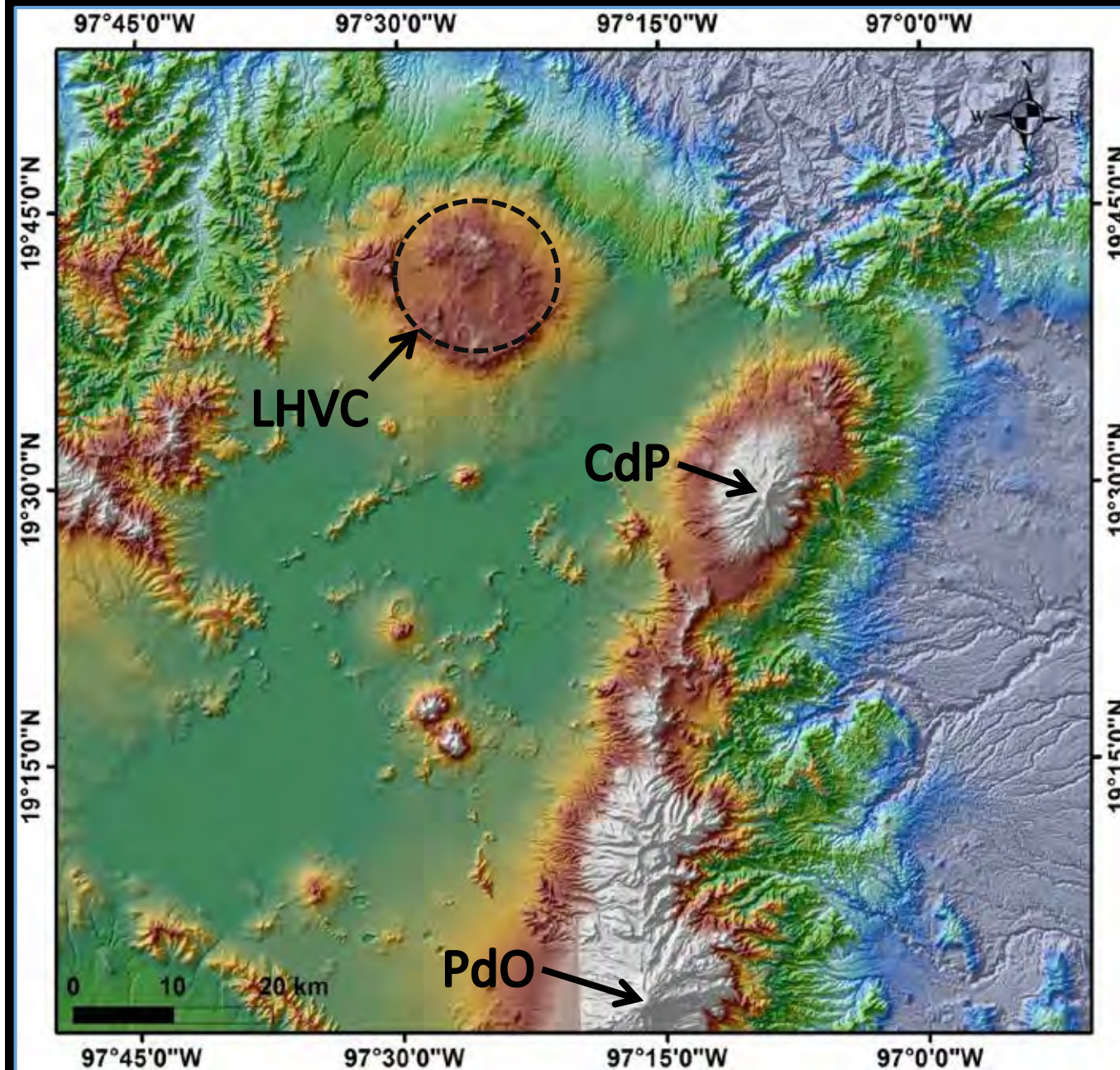


- Geothermal field with less than 50% productive wells
- Geological model of the geothermal field not so accurate

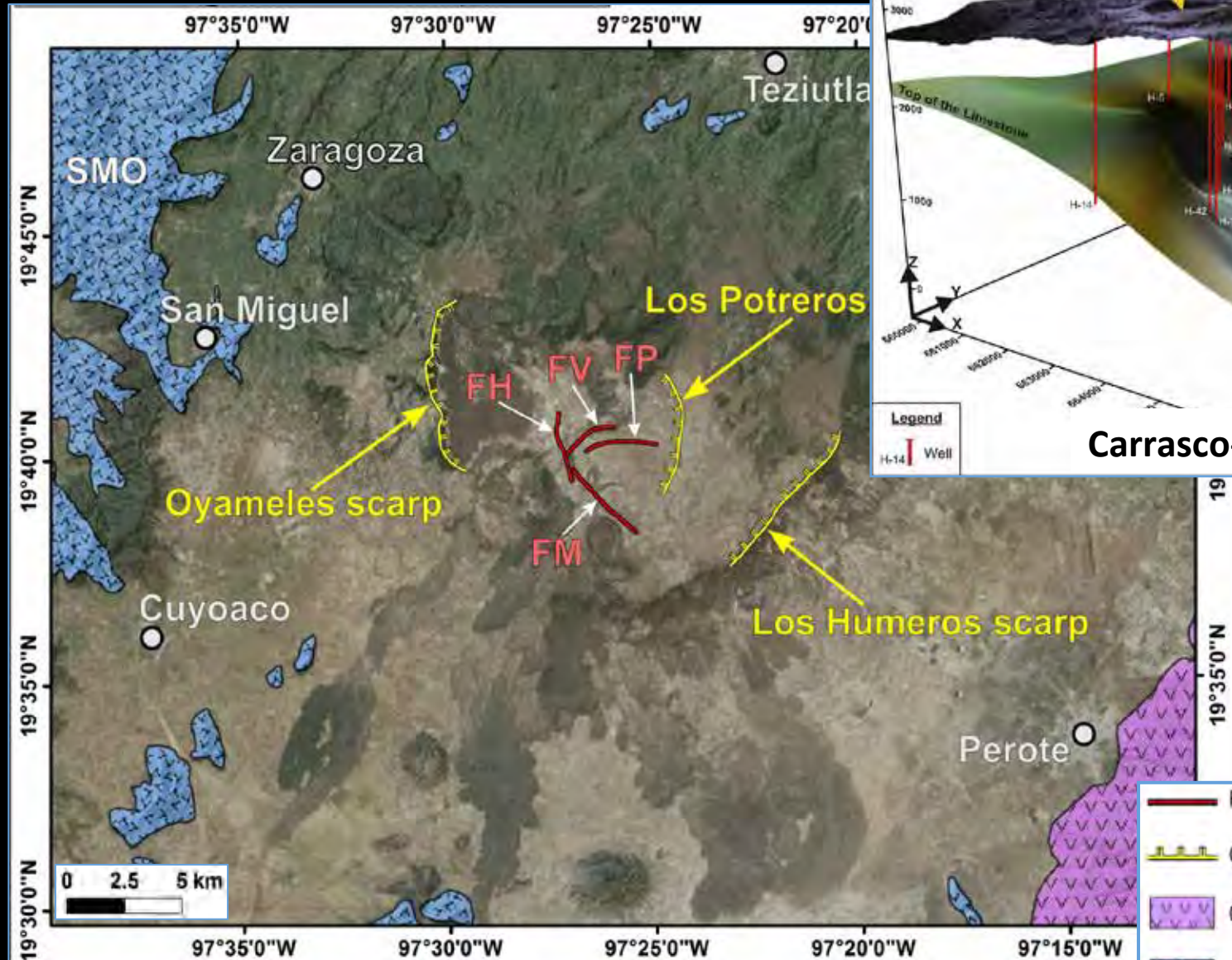
Aim

- 3D geological model based on geological, structural, archaeomagnetic, volcanological data integrated with geophysical and bore data

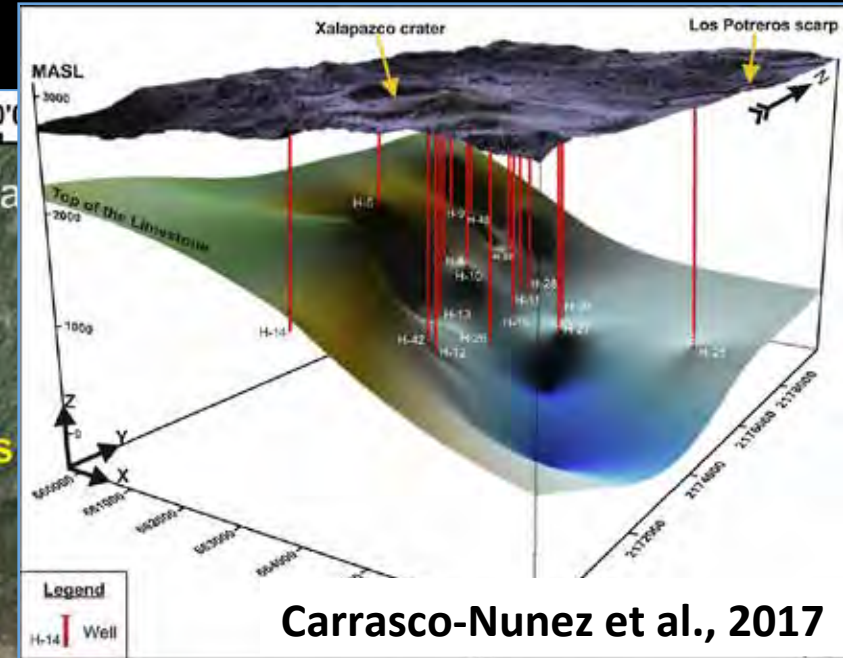
Los Humeros Volcanic Complex



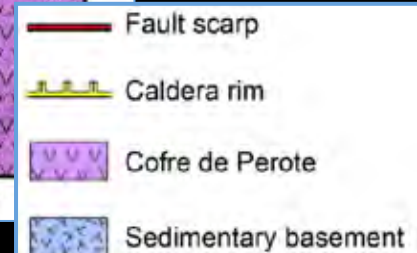
Los Humeros Volcanic Complex



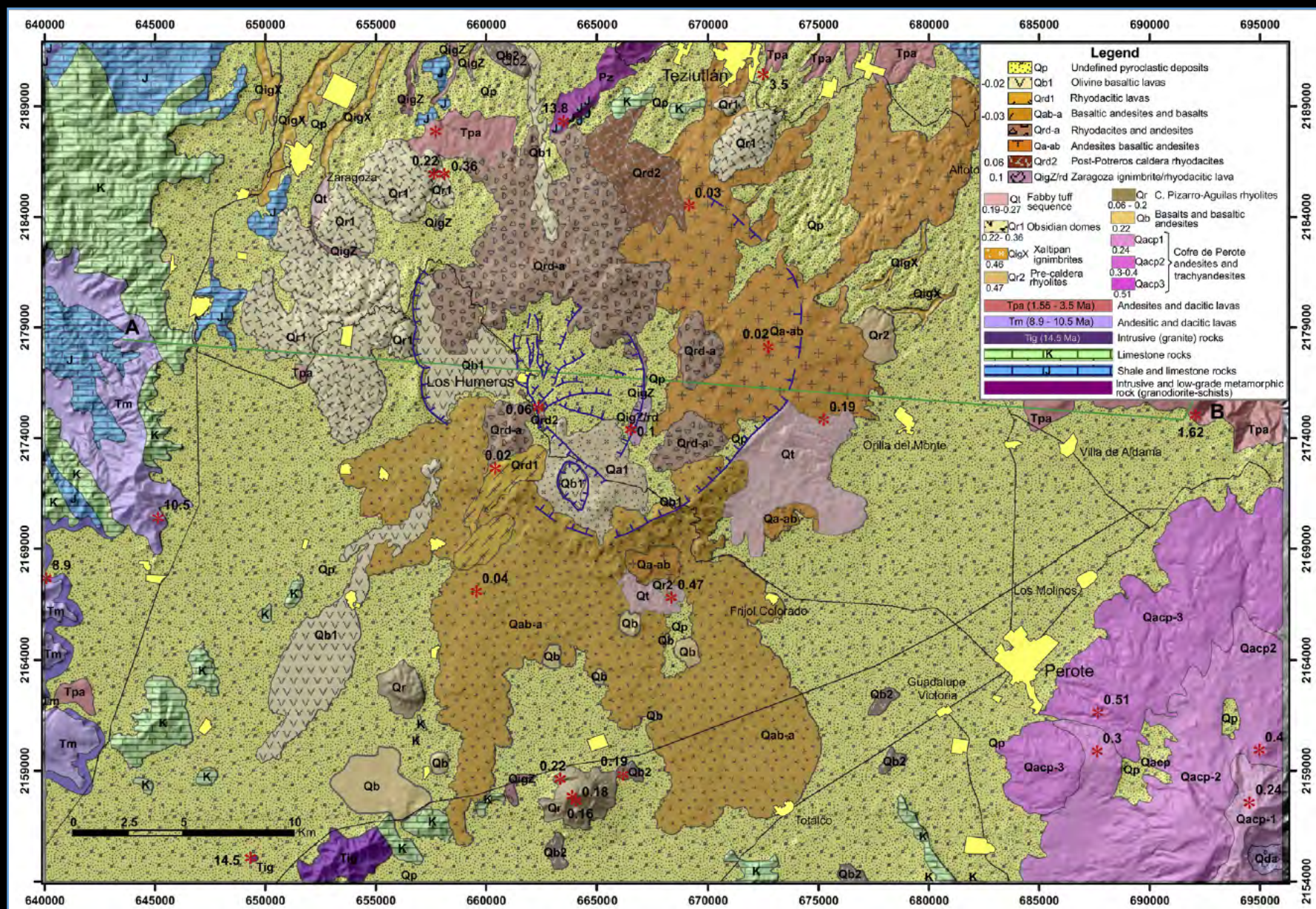
Norini et al., 2015



Carrasco-Nunez et al., 2017



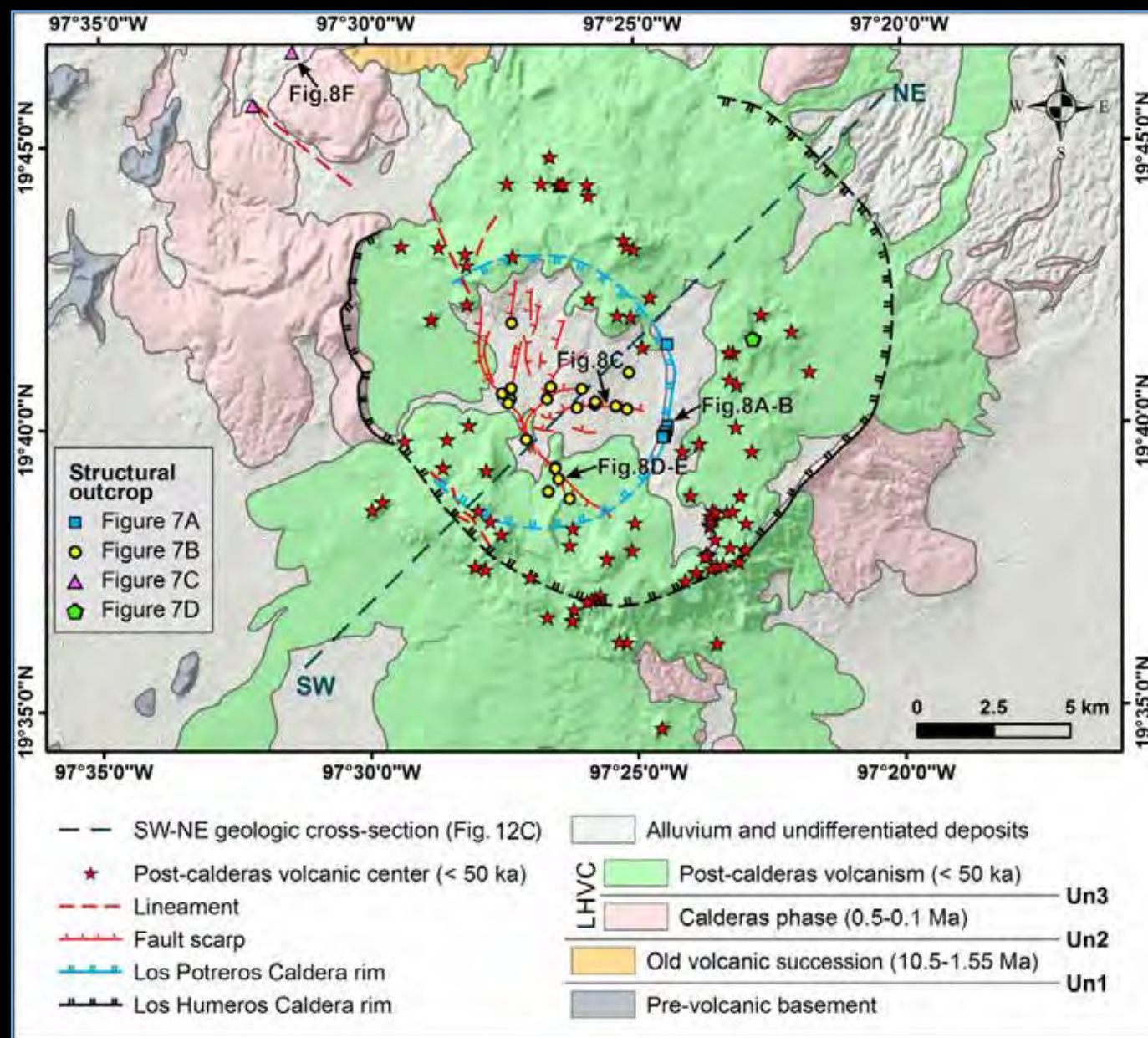
Geology of the LHVC



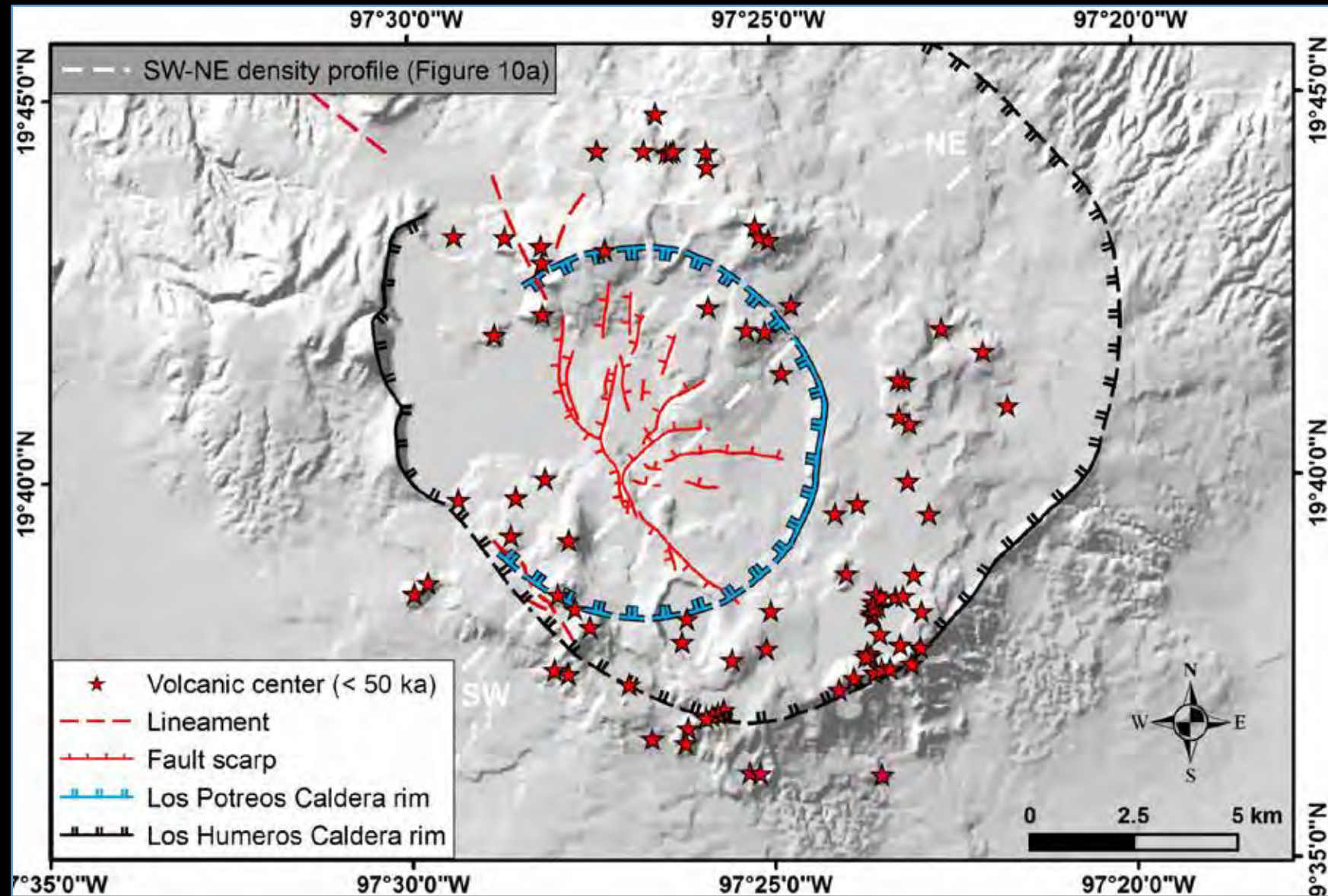
Stratigraphy of the LHVC

A	Age	Stratigraphy of the LHVC area	B	Unconformity Bounded Stratigraphic Units
Cenozoic	*	olivine basalts		Post-calderas volcanism (< 50 ka)
		6.4 ka Cuicuiltic Member		
		20 ka Llano Ignimbrite, rhyodacite lava		
		30-40 ka Tilca Tuff; andesite and scoria cones		
		<50 ka Xoxoctic Tuff and El Limón lava		
	ø	<50 ka rhyodacite and andesite lavas	Un3	Calderas phase (0.5-0.1 Ma)
		100 ka Zaragoza Ignimbrite		
		220 - 350 ka Faby Tuff and rhyolitic domes		
		460 ka Xaltipan Ignimbrite		
	✧	470 ka pre-caldera rhyolites	Un2	Old volcanic succession (10.5-1.55 Ma)
		1.55-5 Ma Teziutlan lavas		
		10.5 Ma Toba Humeros		
		10.5 Ma Cuyuaco and Alseseca lavas		
Mesozoic		31-14 Ma granodiorite and syenite	Un1	Pre-volcanic basement
		limestone, shale and sandstone		
Paleozoic		igneous and metamorphic basement		

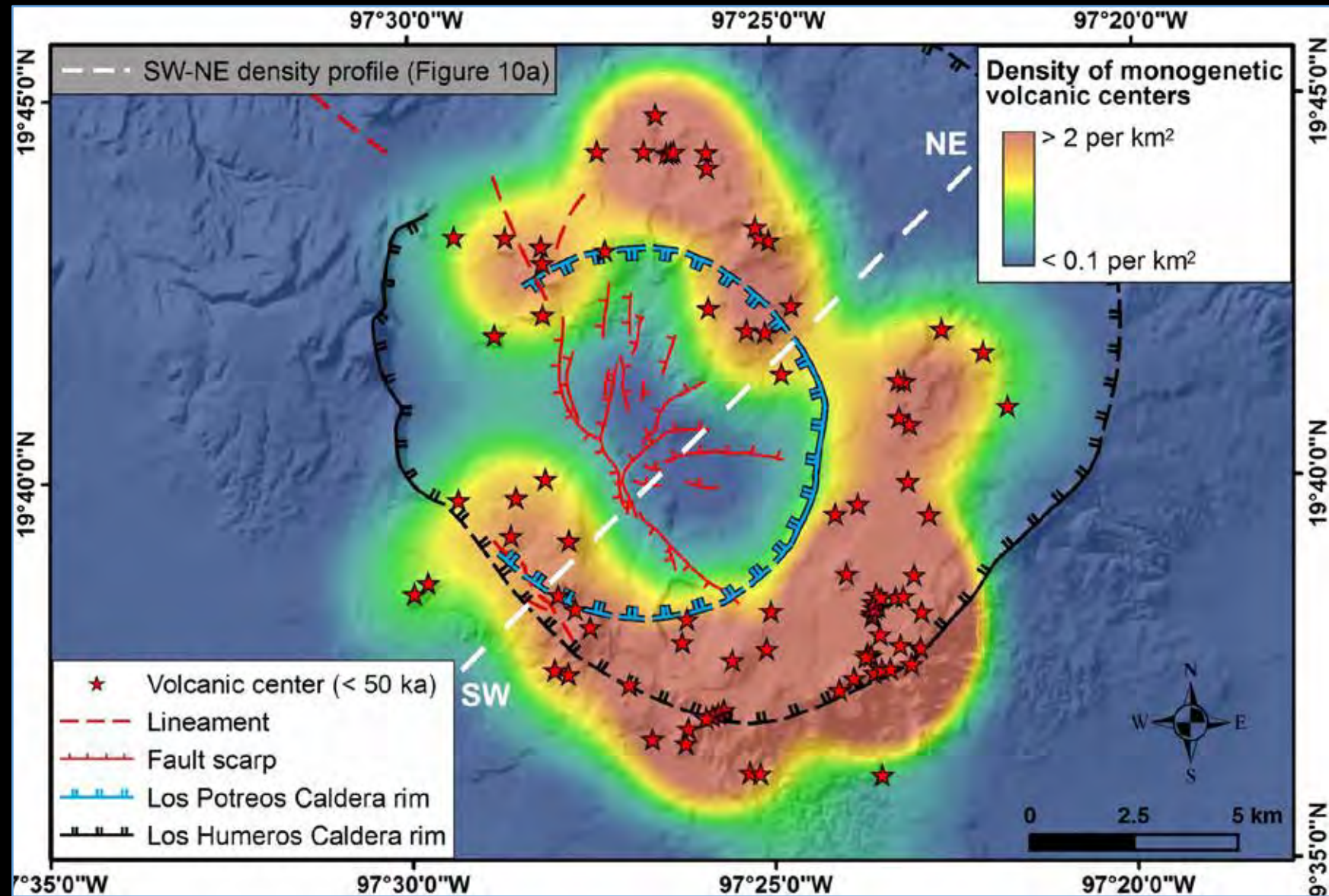
Geology of the LHVC



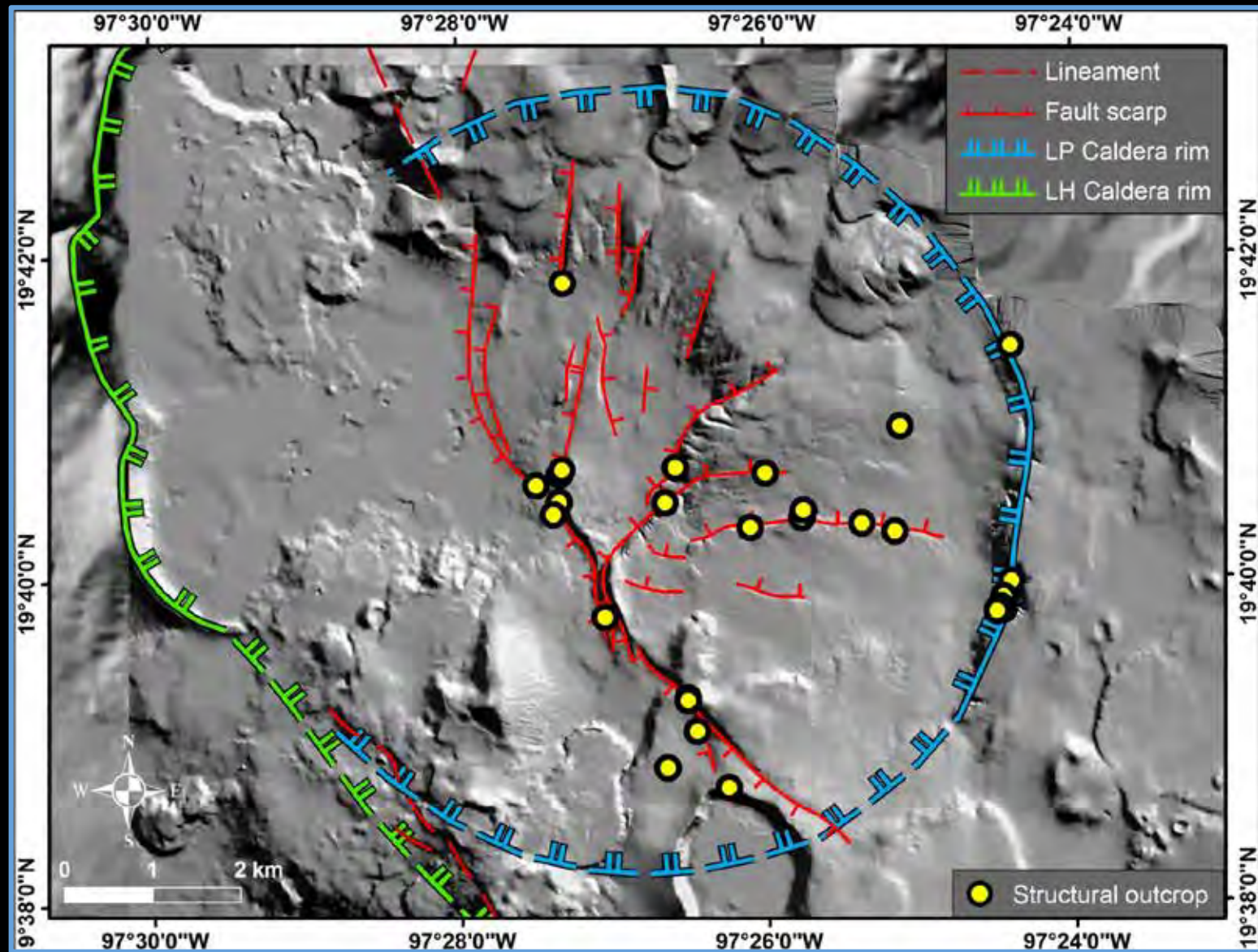
Geology and structure of the LHVC



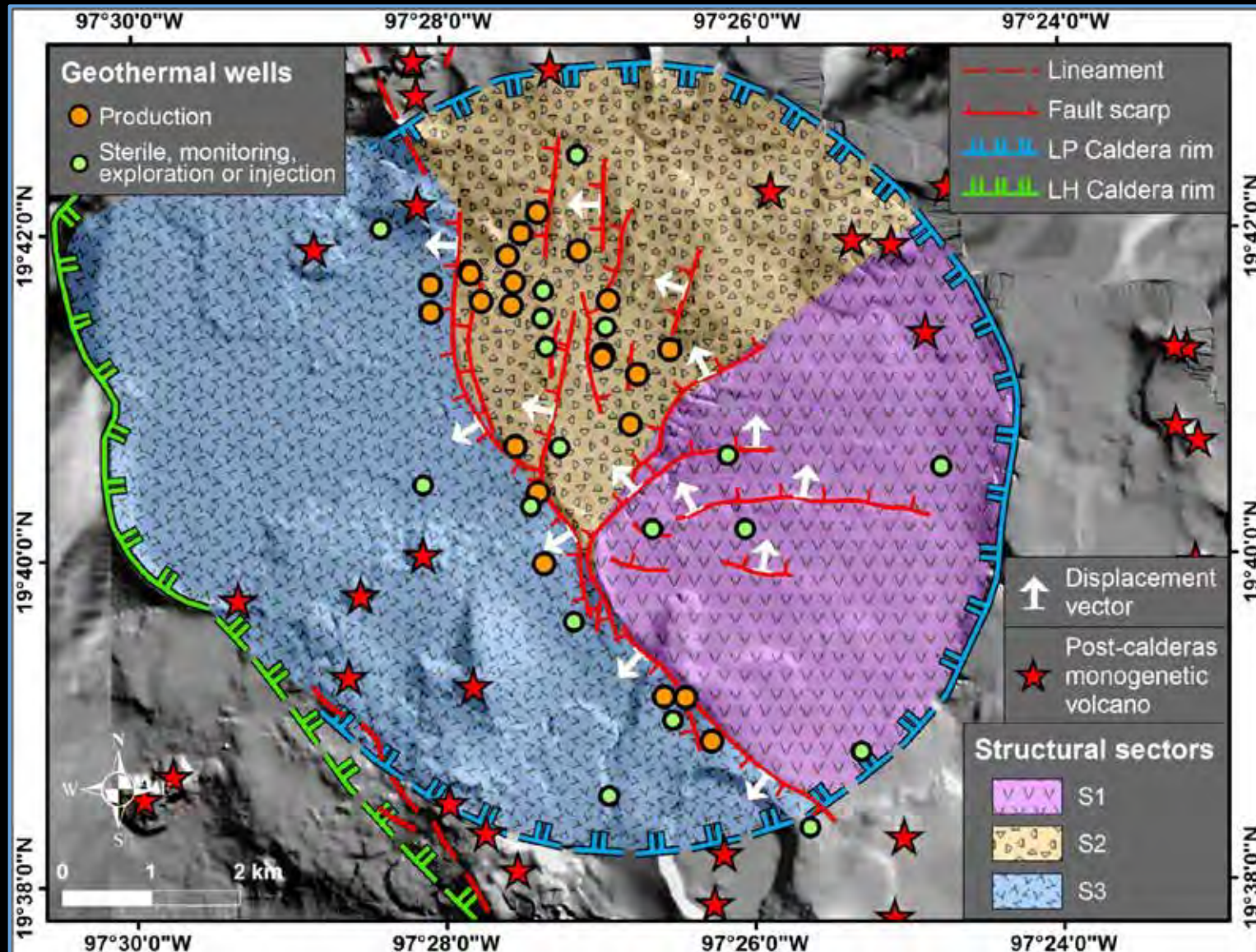
Geology and structure of the LHVC



Geology and structure of the LHVC

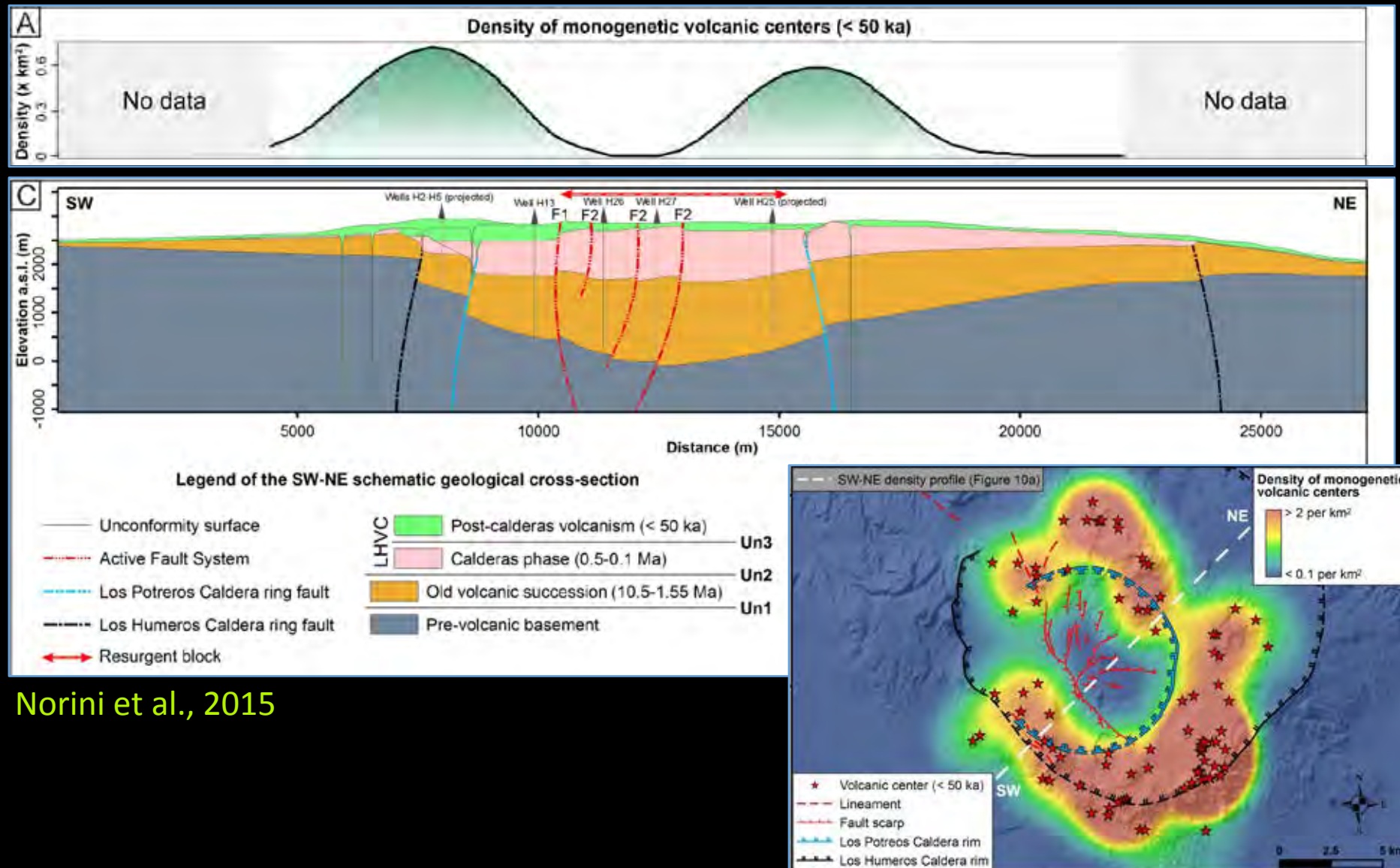


Geology and structure of the LHVC



Norini et al., 2015

Geology and structure of the LHVC



Norini et al., 2015



New data

- Detailed file survey in selected area inside the caldera
- New structural data inside the LHVC and in the surrounding basement
- Archaeomagnetic study to obtain age from holocenic lava flows
- Volcanological study concentrated mainly in the fallout deposits

Geology and structure of the LHVC



Archaeomagnetic sampling and Volcanology of the LHVC





Preliminary results

- A draft of the geological evolution of the most recent activity inside the caldera is available through a detailed field survey. It represents also the base for archaeomagnetic sampling
- New structural data inside the LHVC and in the surrounding basement confirm and detail the structural evolution of the area from Miocene to Present
- A new field work is expected for next autumn to complete the field data collection

A photograph of a sunset over a field. The sun is low on the horizon, partially obscured by clouds, creating a bright orange and yellow glow. The sky transitions from a pale blue at the top to a warm orange near the horizon. The foreground is a dark, silhouetted field of tall grass. In the distance, a line of trees is visible on the horizon. The text "Thank you" is overlaid in a bright yellow-green color.

Thank you